nervous system. It should not, therefore, be relied upon for continuous prolonged administration to the exclusion of other remedies. On the contrary, its use should be supplemented by the administration of general tonics and of special nerve tonics. Iron and arsenic are especially well adapted for this purpose.

In conclusion the following propositions are presented:

1. At the time of life when the menopause occurs the various organs of a woman's body are likely to be in a state of depression as regards either their nutrition or functional activity, so that the normal equilibrium of healthy action may be easily disturbed, and abnormal action, the manifestation of disordered function, may be inaugurated and perpetuated.
2. The cessation of menstruation is an event of great physiological importance, and is perfectly competent to produce grave disturbances of the nervous system, if any predisposition to them already exists.
3. The more common disorders of the nervous system occurring under these circumstances are functional in character, and are associated with disturbances of functions of other organs, and especially of the digestive, circulatory, and hæmatopoietic systems.
4. In their treatment, attention should first be paid to improving the general nutrition of all the tissues of the body, and restoring each organ to its normal activity.
5. If, after all the other organs have resumed the proper performance of their functions, symptoms referable to a disordered condition of the nervous system still persist, recourse must be had to remedies which act directly upon the nervous system, either by improving its nutrition or by modifying and regulating its action.

THE FULL CORRECTION OF MYOPIA.[1]

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Statistical studies of ametropia, the natural history of eye-strain and the behavior of emmetropic and ametropic eyes under the requirements of our present social organization, all support the idea that the emmetropic eye is the ideal eye; that emmetropia is the standard toward which the evolution of the eye has proceeded. The mass of eyes present low hyperopia; that is, they approximate the emmetropic standard from the side of hyperopia—the safe side—and they approach it with remarkable nearness and accuracy. The ametropic eye is at a disadvantage. It has to sustain itself and do its work under conditions to which the delicate balances of its actions and nutrition have not been adjusted by the process of evolution, and that under such conditions those balances are destroyed and disease results is not to be wondered at. Further, all statistics of the refraction of the eye in childhood or in races living under primitive conditions, as well as the known requirements of human life up to the late generations of civilized man, indicate that of all forms of ametropia the one to which the conditions of nutrition are least likely to be adapted is myopia.

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[1] Read before the American Ophthalmological Society.

This proposition is supported by all clinical observation. The myopic eye almost invariably presents the evidence of such destruction of the balance of the nutritive processes as constitutes organic disease of its nutritive coat, the choroid. Of the intimate connection of myopia and choroidal disease there is no question, and without asserting that the myopia is always cause and the choroidal lesions effect, it must be admitted that to a considerable extent and in all the more advanced cases such a relation does exist.

In view of these facts, it would seem rational that when an eye is found working under the disadvantages of myopia it should at once be placed under the same favorable conditions as the emmetropic eye—that its myopia should be fully corrected and the correcting lens constantly worn, except at such time and to such extent as the emmetropic eye would require the aid of convex lenses for presbyopia. This is, I believe, the proper attitude to take toward myopia. Such a line of treatment should be followed except where it is clearly and definitely contra-indicated in one of the ways to be referred to hereafter.

It is, however, certain that on the part of a considerable number of ophthalmologists there is a disposition to avoid the giving of a full correction for myopia, or a timidity about it that keeps them from giving such lenses for constant use, or induces the advice to use the glasses as little as possible. This timidity is abundantly evidenced in ophthalmic literature and in the practice of colleagues, and was formerly largely shared by myself. It is to aid in showing that such timidity is mistaken and harmful that I bring forward a portion of my clinical experience in this matter.

The following are notes of all the cases in private practice remaining under my observation for three years or upward after they commenced the constant wearing of the concave lenses, fully correcting their myopia or myopic astigmatism. The letters M. and F. indicate male and female. The age given is that at which the wearing of the full correction was commenced; and the occupations are those followed since putting on the glasses:

CASE I.—F., aged thirty-one years, a school-teacher, was ordered:
Right.—1.50 cyl. axis 180°. V. = 4/4.
Left.—0.75 cyl. axis 180°. V. = 4/4.
After wearing these for three years constantly, the refraction and acuteness of vision remained unchanged.

CASE II.—M., aged twenty four years, a bank clerk, was ordered:
Right.—1.75 sph. ○ — 0.37 cyl. axis 45°. V. = 4/3.
Left.—0.75 sph. ○ — 0.62 cyl. axis 30°. V. = 4/3 partly.
After three years, refraction and visual acuteness unchanged.

CASE III.—F., aged twenty-three years, doing housework, with reading and sewing, ordered:
Right.—5.50 sph. ○ — 1. cyl. axis 90°. V. = 4/8.
Left.—5.50 sph. ○ — 0.75 cyl. axis 135°. V. = 4/8.
After three years, refraction and visual acuteness unchanged.

CASE IV.—F., aged fifty-two years, librarian, was ordered:
Right.—15. D. sph. V. = 4/6.
Left.—14. D. sph. V. = 4/9.
Accommodation being entirely gone, she was ordered for near work: Right, 11. D., and left, 10. D. Previously she had worn 8. D. lenses for constant use, with a pair of 5. D. lenses in extra fronts which she occasionally added for clearer distant vision. After three years, refraction and visual acuteness remain unchanged, and the glasses have been in every way satisfactory.

CASE V.—F., aged forty-five years, housekeeping and reading, was ordered for constant use:
Right.—8. sph. ○ — 5. cyl. axis 25°. V. = 4/8 mostly.
Left.—8. sph. ○ — 11. D. cyl. axis 5°.
This was the full correction for the right eye, but the left eye required an additional 8. D. spherical, which gave vision = 4/12 mostly. She could not use the two eyes together satisfactorily, so the above was given, allowing her to use the right for distant, and the left for near, vision. After three years, refraction and visual acuteness remain unchanged.

CASE VI.—M., aged thirty-six years, clerk, was ordered:
Right.—2.25 sph. ○ — 1.25 cyl. axis 105°. V. = 4/4.
Left.—2.25 sph ○ — 1.25 cyl. axis 65°. V. = 4/4.
Three years' constant use of the glasses with hard eye-work leaves the eyes healthy, with refraction and visual acuteness unchanged.

CASE VII.—M., aged twenty-four years, architect, was ordered for constant use:
Right.—0.25 sph. ○ — 0.50 cyl. axis 115°. V. = 4/4.
Left.—0.25 sph. ○ — 0.25 cyl. axis 20°. V. = 4/4.
After three years the refraction and vision remain unchanged.

CASE VIII.—F., aged sixteen years, in school, was ordered:
Right.—0.50 cyl. axis 180°. V. = 4/4.
Left.—0.50 cyl. axis 180°. V. = 4/4.
Three and one-half years later the refractive condition and vision were as follows:
Right.—0.25 sph. ○ — 1.25 cyl. axis 180°. V. = 4/4.
Left.—0.50 sph. ○ — 0.75 cyl. axis 180°. V. = 4/4.

CASE IX.—F., aged fifty-six years, a teacher of Latin, in poor general health, was ordered:

Right.—5. sph. V. = 5/9.
Left.—6.50 sph. V. = 5/9.

These were used for distant vision, while for near work concave lenses three dioptres weaker were given. After four years, visual acuteness and refraction unchanged.

Case X.—F., aged thirty-four years, housekeeping, was given for constant use:

Right.—0.75 sph. ○ —3. cyl. axis 180°. V. = 4/8.
Left.—0.75 sph. V. = 4/4.

Four years later her correcting lenses and vision were as follows:

Right.—0.75 sph. ○ — 3.25 cyl. axis 170°. V. = 4/5.
Left.—0.50 sph. ○ — 0.50 cyl. axis 60°. V. = 4/4.

The improvement of vision in the right eye being doubtless of the kind that frequently occurs from the wearing of the correction for high astigmatism.

Case XI.—M., aged fifty-six years, an actor, was ordered for distant vision:

Right.—1.25 sph. ○ — 1.50 cyl. axis 95°. V. = 4/4.
Left.—0.75 sph. ○ — 1.50 cyl. axis 75°. V. = 4/4.

Reading glasses were given allowing 2.75 D. spherical for presbyopia. After four years he is still using the same lenses with comfort, with acuteness of vision unchanged.

Case XII.—F., aged twenty-seven years, housekeeping, was ordered for constant use:

Right.—0.75 cyl. axis 170°. V. = 4/3.
Left —1. cyl. axis 10°. V. = 4/3.

Four years later she was found to require the following:

Right.—0.75 sph. ○ + 1.25 cyl. axis 82°. V. = 4/3.
Left.—1. sph. ○ + 1.50 cyl. axis 90°. V. = 4/3.

The myopic meridian having remained unchanged, and the emmetropic meridian become notably hyperopic.

Case XIII.—M., aged forty-eight years, editor, was given for distant vision:

Right.—3.50 sph. ○ — 0.62 cyl. axis 95°. V. = 4/3.
Left.—3. sph. ○ — 0.62 cyl. axis 70°. V. = 4/3.

For reading he was given glasses with three dioptres weaker sphericals, and after four and a half years requires the following correction.

Right.—3.50 sph. ○ — 0.87 cyl. axis 100°. V. = 4/3.
Left.—3.25 sph. ○ — 0.75 cyl. axis 75°. V. = 4/3.

Before coming under my care he had suffered from serious choroidal irritation, and his myopia had been to some extent progressive.

Case XIV.—F., aged nineteen years, student and teacher; ordered for:

Right.—2.25 sph. ○ — 0.50 cyl. axis 5°. V. = 4/4.
Left.—2.50 sph. ○ — 0.25 cyl. axis 165°. V. = 4/4.

After five years she was found to require:

Right.—2.25 sph. ○ — 0.75 cyl. axis 15°. V. = 4/4.
Left.—2.50 sph ○ — 0.62 cyl. axis 165°. V. = 4/4.

Case XV.—F., aged twelve years, in school, was brought to me for eye-strain. Under full mydriasis she was found to be emmetropic, with vision = 4/3 partly in each eye. With other measures she was given convex sphericals of 1. D. combined with prism 1° base in for use in reading and studying, and was entirely relieved. Two and one-half years later she returned, and was found to require the following correction, which was prescribed and worn constantly:

Right.—0.50 sph. ○ — 0.25 cyl. axis 110°.

Left.—0.25 sph.

These for a time also relieved her, but two years later she required:

Right.—1.75 sph. ○ — 0.62 cyl. axis 110°.

Left.—1. sph. ○ — 0.25 cyl. axis 60°.

Vision has remained the same, and since the last change of glasses four years have elapsed without material change of refraction.

Case XVI.—M., aged sixteen years, student, ordered for constant use:

Right.—1.75 sph. ○ — 0.37 cyl. axis 80°. V. = 4/3.

Left.—1.75 sph. V. = 4/3.

This patient came with a very clear history of myopia recently progressive, and its course was immediately checked, although near work was continued as before. Two and one-half years later he was found to require:

Right.—2. sph. ○ — 0.37 cyl. axis 65°.

Left.—1.75 sph. ○ — 0.37 cyl. axis 80°.

Since then three years have elapsed without change of vision or refraction.

Case XVII.—F., aged eleven years, at school, required and was ordered:

Right.—6. sph. ○ — 0.50 cyl. axis 90°. V. = 4/5.

Left.—6. sph. V. = 4/5.

These have been worn constantly for five years without change of visual acuteness or refraction.

Case XVIII.—M., aged twenty-eight years, bookkeeper, was ordered:

Right.—1.25 sph. ○ — 0.50 cyl. axis 110°. V. = 4/3 partly.

Left.—1.25 sph. ○ — 0.75 cyl. axis 10°. V. = 4/3 partly.

For a little time he was given weaker sphericals, with the same cylindrical lenses for close work, but soon gave them up. After five years his refraction was:

Right.—1. sph. ○ — 0.37 cyl. axis 115°.

Left.—0.75 sph. ○ — 1.37 cyl. axis 5°.

Vision remained unchanged.

Case XIX.—F., aged fourteen years, in school, and subsequently teaching, ordered:

Right.—2.75 sph. V. = 4/4

Left.—1.50 ○ — 0.50 cyl. axis 35°. V. = 4/4

This patient came with history of increasing near-sightedness, for which she had been using for about a year concave 1.5 D. sphericals for distant vision. The disks were obscured by pink striated swellings, the neighboring retina swollen and hyperæmic, the choroids "fleecy," and the best obtainable vision = 4/6. After ten days' use of duboisine her vision had improved to that given above, the swelling and hyperæmia had subsided, and a narrow crescent of choroidal atrophy was visible at the temporal side of the disk. After this, with the constant use of the glasses, vision remained clear and satisfactory for several years. Then she noticed gradual failure of distant vision without other inconvenience, and at the end of six years was found to require:

Right.—4.50 sph.

Left.—3. sph. ○ — 0.37 cyl. axis 25°.

In two years that have elapsed since, there has been no change of refraction, and vision is as good as ever. During the whole period she has been engaged in work requiring exacting use of the eyes.

CASE XX.—M., aged forty-nine years, merchant, was given for distance:

Right.—0.50 sph. ○ — 3.25 cyl. axis 33°. V. = 4/4 partly.
Left.—0.75 sph. ○ — 4.25 cyl. axis 160°. V. = 4/4 partly.

And for near work 2. D. spherical was allowed for presbyopia. After six years his visual acuteness was unchanged, and he required the following correction:

Right.—3.50 cyl. axis 33°.
Left.—0.37 sph. ○ — 4.50 cyl. axis 163°.

CASE XXI.—F., aged thirty-four years, bookkeeper, came for acquired myopia and difficulty of seeing with the left eye of a week's standing. She had a small partial central scotoma due to acute choroiditis. The latter yielded promptly to treatment, and she was ordered:

Right.—1.25 sph. ○ — 0.50 cyl. axis 100°. V. = 4/4.
Left.—1. sph. ○ — 0.25 cyl. axis 180°. V. = 4/4.

She was also given glasses with weaker sphericals for near work, which were used considerably from time to time but ultimately discarded. At the end of seven years she requires:

Right.—1. sph. ○ — 0.87 cyl. axis 95°. V. = 4/3 partly.
Left.—0.87 sph. V.= 4/3 partly.

CASE XXII.—F., aged twenty-four years, art student, was ordered:

Right.—5. sph. ○ — 1.25 cyl. axis 35°. V. = 4/8 partly.
Left.—3. sph. ○ — 1.25 cyl. axis 140°. V. = 4/4.

She has worn these glasses constantly ever since; vision remains unchanged for distance. She states that "they meet every requirement," and that "the eyes never ache or give any trouble." But as they have not been recently tested it may be that in the seven years that have elapsed there may have been some change of the myopia.

CASE XXIII.—F., aged seventeen years, student, teacher, and journalist, was ordered:

Right.—3.75 sph. ○ — 0.50 cyl. axis 105°. V. = 4/5.
Left.—4. sph. V. = 4/4.

After four years it was found that she required:

Right.—3.50 sph. ○ — 0.75 cyl. axis 105°. V. = 4/3 partly.
Left.—3.50 sph. ○ — 0.37 cyl. axis 150°. V. = 4/3 partly.

These glasses have now been worn four years; vision is unchanged, the eyes quite comfortable, and the fundus normal.

CASE XXIV.—F., aged fourteen years, student and teacher, with a clear history of progressive myopia, was ordered:

Right.—5.75 sph. ○ — 1.50 cyl. axis 180°. V. = 4/6 partly.
Left.—5.75 sph. V. = 4/6.

After six years she returned with trouble with her eyes and the habit of looking obliquely through her glasses, and was found to require:

Right.=5.50 sph. ○ — 2.25 cyl. axis 180°. V. = 4/6.
Left.—5.75 sph. ○ — 0.87 cyl. axis 175°. V. = 4/4 partly.

These she has worn for two years without further change or trouble.

CASE XXV.—F., aged twenty-one years, housekeeping, a great reader, was ordered:

Right.—6. sph. V. = 4/6.
Left.—6. sph. V. = 4/6.

These were worn constantly for five years. Then a — 0.50 cyl. axis 180° was added to the left eye, and she continued to use them without any change of acuteness of vision or trouble with the eyes until her death, four years later.

CASE XXVI.—F., aged thirty-two years, music-teacher, had irregular astigmatism and increasing myopia, for which she had worn 3. D. sphericals. She was given for constant use:

Right.—3.75 sph. ⊃ — 1.75 cyl. axis 110°. V. = 4/9.
Left.—5.25 sph. ⊃ — 2. cyl. axis 70°. V. = 4/9.

These have been worn for nine years without change of visual acuteness or trouble of any kind with the eyes.

CASE XXVII.—M., aged seventeen years, student and bookkeeper, came with a history of myopia increasing for two or three years. He was ordered:

Right.—4.25 spherical. V. = 4/3 partly.
Left.—3.75 spherical. V. = 4/3 partly.

Three years later his eyes were still comfortable and acuteness of vision unchanged. But about eighteen months after that he returned with symptoms of eye-strain and imperfect distant vision. He was now found to require, and was ordered:

Right.—5.25 sph. ⊃ — 0.25 cyl. axis 30°. V. = 4/3 mostly.
Left.—4.25 sph. ⊃ — 0.50 cyl. axis 145°. V. = 4/3 mostly.

Two years later, after a period of profound anæmia and disturbance of general health, he returned, and was given the following correction:

Right.—5.50 sph. ⊃ — 0.75 cyl. axis 60°. V. = 4/3 mostly.
Left.—5. sph. ⊃ — 0.50 cyl. axis 120°. V. = 4/3 mostly.

Since then two years have elapsed without further change of refraction or evidence of disturbance of ocular nutrition.

A review of the above shows that of 27 cases, 19 exhibited no change in the amount of myopia of over one-quarter dioptre during the period that they were under observation, varying from three to nine years; that in five cases—VIII., XV., XIX., XXIV., and XXVII.—there was some increase of myopia; and that in three cases—XII., XX., and XXIII.—the myopia diminished. It is, however, of equal importance to observe that in no case was there any diminution of visual acuteness, that all cases of increase of myopia were between the ages of twelve and twenty-five years, and that *in every case the full correction of the myopia checked, at least temporarily, the progress of disease in the eye,* and gave relief from the symptoms of eye-strain which in a large proportion of cases brought the patient to seek professional aid.

In Cases IV., V., IX., XI., XIII., and XX., the patient having passed the age of forty-five, allowance had to be made for presbyopia; but, except for near work, the full correction was worn constantly, without increase of myopia or other unpleasant effect in any case.

The cases above reported are all that I have treated by the constant use of the full correction that have remained under observation three years or upward. In addition, I have had a considerably larger number that were under observation for shorter periods, in none of whom have

I reason to think there has since been increase of myopia or other unfavorable symptoms, although it is not unlikely that cases of such change may have occurred. The cases that might be considered unfavorable—those in which there was subsequent return of asthenopia and increase of myopia—are all included in the above series. I can furnish an equal number of unfavorable cases from a much smaller series treated by partial corrections before becoming satisfied of the superiority of the plan of full correction.

If clinical experience makes such favorable report of the plan of full correction, and I believe that my experience in this regard will not be found exceptional, it will be of interest to inquire why it has been regarded with doubt, or the practice directly opposed by so large a number of writers and practitioners. Apparently this attitude is due to a fear that use of the accommodation is likely to cause increase of myopia. This fear is readily recognized in the teachings of many ophthalmologists, as in this statement which Landolt (*Refraction and Accommodation of the Eye*, English edition, p. 490) emphasizes by printing in small capitals: "A myope must be prohibited from wearing a concave glass for any distance at which he can see clearly without accommodation."

It is taught that use of the accommodation tends to increase the intra-ocular tension. In support of this, reference is sometimes made to certain experiments upon the lower animals. But of these experiments, it is only needful here to remark that their results have, on the whole, been utterly contradictory, and that the conditions of experiment are so different from those of physiological accommodation as to make even definite and confirmed results inapplicable to the question under consideration.

Next there is adduced the phenomenon to which attention was first called by Graefe, that if during the ophthalmoscopic examination the patient were induced to make a strong effort of accommodation there was a visible increase in the pulsation of the retinal veins. The observation as to the occurrence of this increased pulsation is easily verified, and the most probable explanation of it is that of increased intra-ocular tension. But the inference that this increase of tension is due to the use of the accommodation is incorrect. No such exertion of the accommodation as is required to cause the increased pulsation is possible without increased innervation of the lateral recti muscles, if not actual convergence of the visual axes. And in view of the compressing effect that contraction of the recti muscles necessarily has on the globe, it is entirely gratuitous to attribute any accompanying change of tension to exertion of the accommodation. Furthermore, the pulsation occurs under similar effort in eyes in which the accommodation is completely paralyzed by a mydriatic.

Again, it is frequently stated that the power of accommodation is essentially less in myopic than in hyperopic and emmetropic eyes, and this statement is commonly supported by reference to alleged differences in the ciliary muscle in myopic and hyperopic eyes, and a plausible explanation of why we ought to expect the accommodative power to be less in myopes. As a matter of careful observation, I do not find any general or essential deficiency in the accommodative power of myopic eyes. And where at the first trial some deficiency is found, it rapidly disappears with the constant use of the correcting lenses.

The best reason for fearing harm from accommodative effort in myopia is found in our acquaintance with its disastrous effects in other forms of ametropia. The retinal and choroidal changes of eye-strain are constantly before our eyes, and they are, without doubt, often associated with undue effort of accommodation. But it should be remembered that for the accommodation, as for every other function, there is a normal activity as well as an abnormal one, there is use as distinguished from abuse, and that the one is probably as important a factor in sustaining the ocular health as the other is in developing disease.

In this connection let me submit this thought: It is probable that there is some method of physiological compensation for increased functional activity within the eyeball by an increased flow of nutritive and excretory fluids. Now, from what we know of the relation of the ciliary body to the intra-ocular nutritive supply, and its relation to the paths of outflow, it is extremely probable that the act of accommodation does exert a decided influence upon the nutrition of the eye, and that the exertion of the accommodation in some such manner as it is exerted in emmetropic or slightly hyperopic eyes is an important factor in sustaining the intra-ocular health. It is not unlikely that certain choroidal conditions, common to myopic eyes and those that are suffering from senile degeneration, are directly due to the absence of active accommodation.

Finally, those who do not practise the full correction of myopia feel confirmed in their position by the frequently injurious effects of partial corrections. They reason that if the wearing of a weak concave lens is disastrous, the wearing of a stronger one would be more disastrous. But in this they err, failing to appreciate that the wearing of a partial correction of myopia is necessarily more dangerous than the wearing of the full correction. The reason of this is that the myope with a partial correction, will, in the effort to see as well at a distance as possible, look obliquely through his glasses, and so get the effect of a tipped or obliquely placed lens. What this effect is has been well shown by Dr. G. Hay (*Transactions of the American Ophthalmological Society*, 1875, p. 319), by Dr. John Green (*ibid.* for 1890, p. 690), and by Pickering and Williams (*Proceedings of the Amer. Academy of Arts and Sciences*, 1874–75). In 1887 I called attention to the practical importance of this in a paper read before the Section on Ophthalmology of the American Medical Association (*Journal of the American Medical Association*, November 9, 1887), but it is still far from being so generally appreciated as its importance demands. This looking obliquely through his correcting lenses causes the myope to receive heterocentric or astigmatic pencils of rays, exposing him to all the dangers of uncorrected astigmatism, aggravated by the fact that with every movement of the head or eyes the amount of such astigmatic effect varies.

Of the conditions contra-indicating the constant use of the full correction for myopia, coexistent presbyopia has already been alluded to. Being universally recognized, no more need be said of it. But allied to it is the condition of a few younger patients doing large amounts of near work, who get along better, if myopes, with an under-correction, if hyperopes with an over-correction for near work, and who even though emmetropic are helped by convex glasses. Two of the patients in the above series were of this class, at least temporarily. Such cases may be suspected from their history, and certainly recognized by trial. But it must be emphasized that they are among myopes, as in other refractive conditions, quite rare.

A second contra-indication is such diminution of visual acuteness that perfect focussing of the rays falling on the retina is not appreciated. Here there remains no reason for giving the full correction, while to get the largest retinal image the weakest lens compatible with such vision as is attainable is indicated. Similar in effect is the condition reached by old myopes when, on account of long familiarity with them, they prefer the large, blurred images of uncorrected or partly corrected myopia, to the small, sharp image of full correction.

Another class of cases to which the full correction should not be given, the only class to which Landolt's dictum, above quoted, applies, is that in which binocular fusion has been partly or wholly given up in the interest of better monocular vision. If relative divergence is fully tolerated, the strain of convergence, which is one of the great indications for the use of the correcting lenses, no longer exists, but is liable to be excited consensually by efforts at accommodation. As this class includes many high myopes, its exception is an important one.

In this connection it should be mentioned that the inconvenience and even pain excited by the first attempts to wear strong correcting glasses are not a contra-indication to their continued use. These may be tempered to the impatience or skepticism of the patient by partial correction or interrupted use of the glasses; but they are of precisely the same significance as the cramp or soreness produced by any other unfamiliar exertion and co-ordination of muscular effort. They are always temporary, and usually trifling in comparison to the benefit soon realized from persisting in the effort.